

REMARKS

This is in response to the Office Action dated May 5, 2005, in which claims 1-10 and 18-20 were withdrawn from consideration; claims 11-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Sugita et al. (U.S. Patent 5,298,282); claims 11-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hitachi LTD (Japanese Patent Abstract 58-128023); claim 11 was rejected under 35 U.S.C. § 102(e) as being anticipated by Wang et al. (US Patent Publication 2003/0019745); claims 11-14 were rejected under 35 U.S.C. § 102(e) as being anticipated by Druz et al. (US Patent Publication 2005/0034979); and claims 15-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hitachi et al. and further in view of Wang et al. With this Amendment, claims 12 and 14 have been canceled and claims 11, 13, and 15-17 have been amended. In reliance on the following remarks, the present application with pending claims 11, 13, and 15-17 is in condition for allowance, and reconsideration and notice to that effect is respectfully requested.

Claims 12 and 14 are canceled without prejudice. In light of the cancellation, the rejection of claims 12 and 14 should be withdrawn.

Rejections Under 35 U.S.C. § 102(b)

In the Office Action, claims 11-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Sugita et al. As amended, claim 11 requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Sugita et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Rather, Sugita et al. teach away from such an arrangement. As disclosed in Sugita et al., substrate 1 travels on the peripheral of a cylindrical can 4 from a supply roll 2 along the direction of arrow A and is wound on a wind-up roll 3. (Column 6, lines 17-18; Column 3, lines 13-16). By contrast, amended claim 11 of the present invention requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. As stated in the specification, "Substrate 44 rotates above aperture 48 of shadow

mask 46 as shown in FIG. 2. The substrate may complete one 360° revolution during deposition or alternatively may rotate several complete revolutions....” (Page 7, lines 7-9). Sugita et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate as required by amended claim 11.

Furthermore, amended claim 11 requires narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Sugita et al. do not show, suggest, or teach an aperture that extends in a radial direction with respect to the axis of rotation of the substrate. Rather, Sugita et al. teach away from such an arrangement. As disclosed by Sugita et al., openings 10a-10c do not extend in a radial direction with respect to the axis of rotation of the substrate. (Figure 3). By contrast, as stated above, amended claim 11 of the present invention requires that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. As stated in the specification, “Oblique deposition occurring through the shadow mask 46 results in only a radial segment of the substrate 44 being deposited at any given instance.....” (Page 10, lines 2-4; Figures 3-5). Sugita et al. do not show, suggest, or teach narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate.

Thus, the rejection of claim 11 as being anticipated by Sugita et al. should be withdrawn and claim 11 allowed. In that claim 11 is in condition for allowance, the rejection of claim 13, which depends therefrom, should be withdrawn as well and claim 13 allowed.

In the Office Action, claims 11-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hitachi et al. As amended, claim 11 requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Hitachi et al. do not show, suggest, or teach

rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Rather, Hitachi et al. teach away from such an arrangement. The Office Action's reliance on rotating jig 2 as a substrate that rotates about an axis of rotation is misplaced. As disclosed in Hitachi et al., even though substrate 1 is fixed to jig 2, it is jig 2 that rotates, not substrate 1. (Abstract). Although substrate 1 may not be stationary, substrate 1 does not rotate about an axis of rotation, but rather rotates around jig 2. By contrast, as stated above, amended claim 11 of the present invention requires rotating the substrate about an axis of rotation during vapor deposition. Hitachi et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate as required by amended claim 11.

Furthermore, amended claim 11 requires narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Hitachi et al. do not show, suggest, or teach that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Rather, Hitachi et al. teach away from such an arrangement. As disclosed in the abstract, center line 8 of fan-shaped slit 7 of mask plate 4 is positioned on a straight line connecting the center line 6 of the substrate 1 to the source 5. Additionally, the figure of Hitachi et al. does not show the aperture extending in a radial direction with respect to the axis of rotation of the substrate. By contrast, as stated above, amended claim 11 of the present invention requires that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Hitachi et al. do not show, suggest, or teach narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate.

Thus, Hitachi et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate or that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. The rejection of claim 11 as being anticipated by Hitachi et al. should be withdrawn and claim 11 allowed. In that claim 11 is in condition for allowance, the rejection of claim 13, which depends therefrom, should be withdrawn as well and claim 13 allowed.

Rejections Under 35 U.S.C. § 102(e)

In the Office Action, claim 11 was rejected under 35 U.S.C. § 102(e) as being anticipated by Wang et al. As amended, claim 11 requires directing vaporized species from a vapor source positioned at an oblique angle to the substrate toward the substrate at a distribution of angles of incidence about an angle θ measured relative to a surface normal of the substrate. Wang et al. do not show, suggest, or teach positioning the vapor source at an oblique angle to the substrate. Rather, Wang et al. teach away from such an arrangement. As shown in FIG. 2A of Wang et al., target (vapor source) 10 is not positioned at an oblique angle to substrate 15, but in line with substrate 15. Oblique deposition is achieved by the device in Wang et al. by angled sheets 17 positioned between target 10 and substrate 15. (Page 2, paragraph 0029). By contrast, claim 11 of the present invention requires that the vapor source be positioned at an oblique angle with respect to the substrate. As stated in the specification and shown in FIG. 2, "The vaporized species 52 travel along a distribution of trajectories...directed at approximately oblique angle θ towards aperture 48 and substrate 44." (Page 6, lines 20-22). Wang et al. do not show, suggest, or teach that the vapor source be positioned at an oblique angle from the substrate as required by amended claim 11.

Furthermore, amended claim 11 requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Wang et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Wang et al. makes no mention of such an arrangement. By contrast, as previously mentioned above, amended claim

11 of the present invention requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Wang et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate.

Furthermore, amended claim 11 requires narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Wang et al. do not show, suggest, or teach that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Rather, Wang et al. teach away from such an arrangement. As disclosed in the specification, openings 20 of the shadow mask extend perpendicular to substrate 15, allowing only the molecules 13 incident perpendicular to the substrate 15 to pass through and coat the substrate. (Page 1, paragraph 6; Figures 1A and 1B). By contrast, as stated above, amended claim 11 of the present invention requires that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Wang et al. do not show, suggest, or teach narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate.

Thus, Wang et al. do not show, suggest, or teach positioning the vapor source at an oblique angle from the substrate, rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate, or that the aperture extend radially with respect to the axis of rotation of the substrate as required by amended claim 11. The rejection of claim 11 as being anticipated by Wang et al. should be withdrawn and claim 11 allowed.

In the Office Action, claims 11-14 were rejected under 35 U.S.C. § 102(e) as being anticipated by Druz et al. As amended, claim 11 requires rotating the substrate about an axis of rotation while depositing the vaporized species on the substrate. Druz et al. do not show, suggest, or teach rotating

the substrate about an axis of rotation while depositing the vaporized species on the substrate. Rather, Druz et al. teach away from such an arrangement. Druz et al. teach moving the substrate orthogonally relative to the vapor source during processing, and potentially rotating the substrate 180° after each cycle. As disclosed in Druz et al., "...orthogonal movement comprises moving the substrate substantially orthogonal to the major dimension of the rectangular aperture. Processing may be performed on one side of the feature if the substrate is moved relative to the aperture without rotation. Alternatively, the substrate may be processed adjacent to both sides of the feature if the substrate is rotated 180° after each cycle...." (Page 3, paragraph 18). By contrast, amended claim 11 requires rotating the substrate about an axis of rotation while depositing vaporized species on the substrate, as stated above. Druz et al. do not show, suggest, or teach rotating the substrate about an axis of rotation while depositing vaporized species on the substrate as required by amended claim 11.

Furthermore, amended claim 11 requires narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Rather, Druz et al. teach away from such an arrangement. Druz et al. do not show, suggest, or teach that the aperture extends in a radial direction with respect to the axis of rotation of the substrate. Rather, Druz et al. teach away from such an arrangement. As disclosed in the specification, aperture 54 of shield 54 has a rectangular shape and is positioned relative to the source 54, but makes no mention that aperture 54 extend radially with respect to the axis of rotation of the substrate. (Page 3, paragraphs 42 and 45). By contrast, amended claim 11 of the present invention requires that the aperture extends in a radial direction with respect to the axis of rotation of the substrate, as stated above. Druz et al. do not show, suggest, or teach narrowing the distribution of angles of incidence by permitting only a portion of the vaporized species traveling at approximately the angle θ to pass through an aperture in a shadow mask positioned between the vapor source and the substrate, wherein the aperture extends in a radial direction with respect to the axis of rotation of the substrate.

The rejection of claim 11 as being anticipated by Druz et al. should be withdrawn and claim 11 allowed. In that claim 11 is in condition for allowance, the rejection of claim 13, which depends therefrom, should be withdrawn as well and claim 13 allowed.

Rejections Under 35 U.S.C. § 103(a)

In the Office Action, claims 15-17 were rejected as being unpatentable over Hitachi et al. and further in view of Wang et al. As claim 11 is in condition for allowance, the rejections of claims 15-17, which depend therefrom, should be withdrawn as well and claims 15-17 allowed.

Claims 13 and 15-17 have been amended to correct informalities and maintain consistency throughout the claims.

In the Specification

As requested by the Office Action, lines 4 and 5 of page 1 have been amended to include the serial numbers of two concurrently filed applications that were not known at the time of the original submission. Line 28 of page 12 and line 10 of page 13 have also been amended to include the serial numbers of the concurrently filed applications.

In the Figures

FIG. 3 has been replaced to add a label that was inadvertently omitted in the original submission. Reference number "53" has been added to refer to the edge of the shadow mask. The Examiner may reference line 20 of page 9 of the specification to see that the number "53" was used to reference the edge of the shadow mask.

FIGS. 4 and 5 have been replaced to add a label that was inadvertently omitted in the original submission. Reference number "52" has been added to both figures to refer to the beam of

vaporized species. The Examiner may reference line 28 of page 9 of the specification to see that the number "52" was used to reference the edge of the beam of vaporized species.

Conclusion

In view of the foregoing, pending claims 11, 13, and 15-17 are in condition for allowance.

A notice to that effect is respectfully requested.

Respectfully submitted,

KINNEY & LANGE, P.A.

Date: 6/15/05

By: 

Ann Kulprathipanja, Reg. No. 50,608

THE KINNEY & LANGE BUILDING

312 South Third Street

Minneapolis, MN 55415-1002

Telephone: (612) 339-1863

Fax: (612) 339-6580

AK:hlw